

CLAIMS

1.- A method for transmission of a calling subscriber number received at a Gateway Mobile Switching Centre (GMSC) [N-101; N-201] of a home Public Land Mobile Network (PLMN) [N-100; N-200] along with an incoming call [S-300] towards a destination subscriber [N-104; N-204] who is roaming subscriber in a visited Public Land Mobile Network [N-100; N-200], said destination subscriber being one of a called subscriber and a forwarded-to subscriber, the method comprising at least one step of interrogating at least one entity selected from GSM network entities [N-102; N-103], UMTS network entities [N-102; N-103] and Inter-Working Functions [N-300] by means of at least one interrogating operation selected from GSM MAP operations, UMTS MAP operations and combinations thereof, in order to retrieve a routing number, and to further reach said roaming subscriber and set up the call;

characterized in that

the step of interrogating at least one of GSM network entities [N-102; N-103], UMTS network entities [N-102; N-103] and Inter-Working Functions [N-300] by means of said interrogating GSM/UMTS MAP operations includes the steps of:

extracting the previously received calling subscriber number identification, to be further sent in an interrogating GSM/UMTS MAP operation, at the interrogating network entity;

including said calling subscriber number identification in the interrogating GSM/UMTS MAP operation [S-175; S-185] at the interrogating network entity;

forwarding said interrogation and said calling subscriber number identification with the interrogating GSM/UMTS MAP operation [S-175; S-185] to said at least one interrogated entity [N-102; N-103; N-300].

2.- A method according to claim 1, wherein an
interrogating GSM/UMTS MAP operation for retrieving the
routing number as well as to submit the calling subscriber
number identification is a MAP operation: "Send Routing
5 Information" [S-175].

3.- A method according to claim 1, wherein an
interrogating GSM/UMTS MAP operation for retrieving a
routing number as well as to submit the calling subscriber
10 number identification is a MAP operation: "Provide Roaming
Number" [S-185].

4.- A method according to any of claims 1, 2 and 3,
wherein the home PLMN [N-100] is one of a GSM network and
15 a UMTS network comprising a home GMSC [N-101], and the
visited PLMN [N-200] where the home subscriber [N-104] is
roaming, is neither a GSM nor a UMTS network.

5.- A method according to claim 4, wherein the home GMSC
20 [N-101] interrogates a GSM/UMTS HLR [N-102] by means of a
MAP operation: "Send Routing Information" [S-175] that
comprises the calling subscriber number identification
data, and wherein the GSM/UMTS HLR [N-102] interrogates an
Inter-Working Function [N-300] used in intersystem roaming
25 by means of a MAP operation: "Provide Roaming Number" [S-
185] that also comprises the calling subscriber number
identification data.

6.- A method according to any of claims 1, 2 and 3,
30 wherein the visited PLMN [N-100] where the home subscriber
[N-204] is roaming, is one of a GSM network and a UMTS
network, and the home PLMN [N-200] is neither a GSM nor a
UMTS network.

35 7.- A method according to claim 6, wherein an Inter-

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Working Function [N-300] used in intersystem roaming interrogates a visited MSC/VLR [N-103] by means of a MAP operation: "Provide Roaming Number" [N-185] that comprises the calling subscriber number identification data.

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8.- A method according to any of claims 1, 2 and 3, wherein the home PLMN [N-100] is one of a GSM network and a UMTS network comprising a home GMSC [N-101], and the visited PLMN [N-100] where the home subscriber [N-104] is roaming, is also one of a GSM network and a UMTS network.

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9.- A method according to claim 8, wherein the home GMSC [N-101] interrogates a GSM/UMTS HLR [N-102] by means of a MAP operation: "Send Routing Information" [N-175] that comprises the calling subscriber number identification data, and wherein the GSM/UMTS HLR [N-102] interrogates the MSC/VLR [N-103] where the subscriber [N-104] is roaming by means of a MAP operation: "Provide Roaming Number" [N-185] that also comprises the calling subscriber number identification data.

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10.- A method according to any of the preceding claims characterized in that said calling subscriber number identification is included as a new parameter of specific type in said MAP operation: "Send Routing Information" [S-175].

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11.- A method according to any of the preceding claims characterized in that said calling subscriber number identification is included in an Extension Container field of said MAP operation: "Send Routing Information" [S-175] instead of a new parameter of specific type.

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12.- A method according to any of the preceding claims characterized in that said calling subscriber number

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identification is included as a new parameter of specific type in said MAP operation: "Provide Roaming Number" [S-185].

5 13.- A method according to any of the preceding claims characterized in that said calling subscriber number identification is included in an Extension Container field of said MAP operation: "Provide Roaming Number" [S-185] instead of a new parameter of specific type.

10 14.- An apparatus for transmission of a calling subscriber number identification received at a home Public Land Mobile Network (PLMN) [N-100; N-200] or at an Inter-Working Function (IWF) [N-300], the apparatus comprising
15 first means for interrogating at least one entity selected from GSM network entities [N-102; N-103], UMTS network entities [N-102; N-103] and Inter-Working Functions [N-300], by means of at least one interrogating operation selected from GSM MAP operations, UMTS MAP operations and
20 combinations thereof, in order to retrieve a routing number, and to further reach a destination subscriber [N-104; N-204] who is a roaming subscribed roaming in a visited Public Land Mobile Network, and set up the call;

characterized in that

25 the apparatus further comprises:

second means for extracting said calling subscriber number identification from a previously received signalling message and to be further sent in an interrogating operation [S-175; S-185] selected from GSM
30 MAP operations, UMTS MAP operations and combinations thereof; and

third means for including said calling subscriber number identification obtained by said second means, in the interrogating GSM/UMTS MAP operation [S-175; S-185] in
35 order to retrieve a routing number, and to further reach

such a roaming subscriber and to set up the call, presenting said calling subscriber number identification.

15.- An apparatus according to claim 14, further comprising means for storing on a per subscriber and per call basis, at any of GSM or UMTS entity, said calling subscriber number identification received in an interrogating GSM/UMTS MAP operation, in order to be further delivered to the destination subscriber.

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16.- An apparatus according to claim 14, wherein said interrogating GSM/UMTS MAP operation is a MAP operation: "Send Routing Information" [S-175], and wherein said MAP operation is designed for including said calling subscriber number identification.

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17.- An apparatus according to any of claims 14 and 15, wherein said interrogating GSM/UMTS MAP operation is a MAP operation: "Provide Roaming Number" [S-185], and wherein said MAP operation is designed for including said calling subscriber number identification.

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18.- An apparatus according to any of claims 14 to 17, wherein the home PLMN [N-100] is one of a GSM network and a UMTS network comprising a home GMSC [N-101], and a visited PLMN [N-200] where the home subscriber [N-104] is roaming, is neither a GSM nor a UMTS network;

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the home GMSC [N-101] interrogates a GSM/UMTS HLR [N-102] by means of a MAP operation: "Send Routing Information" [S-175] that comprises the calling subscriber number identification data; and

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the GSM/UMTS HLR [N-102] interrogates an Inter-Working Function [N-300] used in intersystem roaming by means of a MAP operation: "Provide Roaming Number" [S-185] that also comprises the calling subscriber number

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identification data.

19.- An apparatus according to any of claims 14 to 17,
wherein the visited PLMN [N-100] where the home subscriber
5 [N-204] is roaming, is one of a GSM network and a UMTS
network, and the home PLMN [N-200] is neither a GSM nor a
UMTS network; and

wherein an Inter-Working Function [N-300] used in
intersystem roaming interrogates a visited MSC/VLR [N-103]
10 by means of a MAP operation: "Provide Roaming Number" [S-
185] that comprises the calling subscriber number
identification data.

20.- An apparatus according to any of claims 14 to 17,
15 wherein the home PLMN [N-100] is one of a GSM network and
a UMTS network comprising a home GMSC [N-101], and the
visited PLMN [N-100] where the home subscriber [N-104] is
roaming, is also one of a GSM network and a UMTS network;

the home GMSC [N-101] interrogates a GSM/UMTS HLR [N-
20 102] by means of a MAP operation: "Send Routing
Information" [S-175] that comprises the calling subscriber
number identification data; and

the GSM/UMTS HLR [N-102] interrogates the MSC/VLR [N-
103] where the home subscriber [N-104] is roaming, by
25 means of a MAP operation: "Provide Roaming Number" [S-185]
that also comprises the calling subscriber number
identification data.

21.- An apparatus according to any of claims 14 to 20,
30 wherein said calling subscriber number identification is
included as a new parameter of specific type in said MAP
operation: "Send Routing Information" [S-175].

22.- An apparatus according to any of claims 14 to 20,
35 wherein said calling subscriber number identification is

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included in an Extension Container field of said MAP operation: "Send Routing Information" [S-175]; instead of a new parameter of specific type.

5 23.- An apparatus according to any of claims 14 to 22, wherein said calling subscriber number identification is included as a new parameter of specific type in said MAP operation: "Provide Roaming Number" [S-185].

10 24.- An apparatus according to any of claims 14 to 22, wherein said calling subscriber number identification is included in an Extension Container field of said MAP operation: "Provide Roaming Number" [S-185]; instead of a new parameter of specific type.

15 25.- A method according to any of claims 7 and 9, wherein any of GSM and UMTS MSC/VLR store on a per subscriber and per call basis, the calling subscriber number identification received in a MAP operation: "Provide
20 Roaming Number" [S-185], in order to be further delivered to the destination subscriber.

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